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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,803	12/08/2003	Kia Silverbrook	MTB12US	8900

24011 7590 04/04/2006

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EXAMINER	
MRUK, GEOFFREY S	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/728,803	SILVERBROOK, KIA	
	Examiner	Art Unit	
	Geoffrey Mruk	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-54* is/are pending in the application.

4a) Of the above claim(s) *38-54* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/16/04, 1/23/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election of Group 1, claims 1-37 in the reply filed on 23 January 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 38-54 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 23 January 2006.

Claim Objections

Claims 18 and 37 are objected to because of the following informalities: These claims recite that the coating is applied substantially to all sides of the heater, such that the coating is seamless. The Applicant should remove the word "substantially," because, if the coating were applied to less than the entirety of total surface of the heater, then the coating would not be seamless. Thus, it is necessary for the coating to be applied to all sides of the heater.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 9 and 28 state "each heater element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of a said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of the said drop, from a temperature equal to said ambient temperature to said boiling point". These claims contradict the specification since each heater element is heated above the boiling point of the bubble forming liquid to cause the ink drop to be ejected from the printhead as stated in paragraph 0213.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-7, 11-13, 15, 18-21, 23-26, 30-32, 34, and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Kubby (US 5,706,041).

With respect to claim 1, Kubby discloses an ink jet printhead (Column 1, line 10) comprising:

- a plurality of nozzles (Column 1, line 10);
- a heater (Fig. 1, element 20) associated with each of the nozzles respectively, the heater having a heater element and a pair of electrodes (Fig. 1, element 24),
- the heater element configured for thermal contact with a bubble forming liquid (Column 3, lines 64-67; Column 4, lines 1-4) and
- the electrodes configured for connection to an electrical power source (Column 1, line 20, i.e. digital signal); such that, heating the heater element above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection a drop of ejectable liquid from the nozzle (Column 1, lines 17-30);
- wherein the heater is formed by layers of heater material (Column 3, lines 64-67; Column 4, lines 1-4), the number of layers forming the electrodes exceeds the number of layers forming the heater element (Column 3, lines 54, 61-64, i.e. two conductors 24 per doped region 20).

With respect to claim 2, Kubby discloses the layers of heater material (Fig. 2, elements 20 and 22) forming the element and the electrodes (Fig. 1, element 24) are spaced apart (Column 3, lines 61-64).

With respect to claim 3, Kubby discloses the element (Fig. 1, element 18) has two layers of heater material (Fig. 2, elements 20 and 22) and the electrodes have three layers (Fig.1, element 24, Column 3, lines 54, 61-64) of heater material.

With respect to claim 5, Kubby discloses the bubble forming liquid and the ejectable liquid are of a common body of liquid (Column 1, lines 17-30).

With respect to claim 6, Kubby discloses a page-width printhead (Column 14-16).

With respect to claim 7, Kubby discloses each heater element is in the form of a cantilever beam (Column 1, line 66-67, i.e. suspending the heater chips).

With respect to claim 11, Kubby discloses each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element (Column 1, lines 64-67; Column 2, lines 1-16; Column 4, lines 56-66).

With respect to claim 12, Kubby discloses the bubble which each element is configured to form is collapsible and has a point of collapse, and wherein each heater element is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element (Column 1, line 27, i.e. nucleation).

With respect to claim 13, Kubby discloses a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure (Column 3, lines 31-35; Column 5, lines 41-49, i.e. conventional CMOS processing).

With respect to claim 15, Kubby discloses a plurality of nozzle chambers each corresponding to a respective nozzle, and a plurality of said heater elements being disposed within each chamber, the heater elements within each chamber being formed

on different respective layers (Fig. 1, elements 20 and 24) to one another (Column 1, lines 17-30).

With respect to claim 18, Kubby discloses each heater element is substantially covered by a conformal protective coating (Fig. 3, element Si_3N_4), the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless (Column 4, lines 38-43).

With respect to claim 19, Kubby discloses a printer system (Column 1, line 6), which incorporates a printhead (Column 1, line 5), the printhead comprising:

- a plurality of nozzles (Column 1, line 10);
- a heater (Fig. 1, element 20) associated with each of the nozzles respectively, the heater having a heater element and a pair of electrodes (Fig. 1, element 24),
- the heater element configured for thermal contact with a bubble forming liquid (Column 3, lines 64-67; Column 4, lines 1-4) and
- the electrodes configured for connection to an electrical power source (Column 1, line 20, i.e. digital signal); such that, heating the heater element above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection a drop of ejectable liquid from the nozzle (Column 1, lines 17-30);
- wherein, the heater is formed by layers of heater material (Column 3, lines 64-67; Column 4, lines 1-4), the number of layers forming the electrodes exceeds the number of layers forming the heater element (Column 3, lines 54, 61-64, i.e. two conductors 24 per doped region 20).

With respect to claim 20, Kubby discloses the layers of heater material (Fig. 2, elements 20 and 22) forming the element and the electrodes (Fig. 1, element 24) are spaced apart (Column 3, lines 61-64).

With respect to claim 21, Kubby discloses the element (Fig. 1, element 18) has two layers of heater material (Fig. 2, elements 20 and 22) and the electrodes have three layers (Fig.1, element 24, Column 3, lines 54, 61-64) of heater material.

With respect to claim 23, Kubby discloses the bubble forming liquid in thermal contact with each said heater element, and to support the ejectable liquid adjacent each nozzle (Column 4, lines 56-66).

With respect to claim 24, Kubby discloses the bubble forming liquid and the ejectable liquid are of a common body of liquid (Column 1, lines 17-30).

With respect to claim 25, Kubby discloses a page-width printhead (Column 14-16).

With respect to claim 26, Kubby discloses each heater element is in the form of a cantilever beam (Column 1, line 66-67, i.e. suspending the heater chips).

With respect to claim 30, Kubby discloses each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element (Column 1, lines 64-67; Column 2, lines 1-16; Column 4, lines 56-66).

With respect to claim 31, Kubby discloses the bubble which each element is configured to form is collapsible and has a point of collapse, and wherein each heater

element is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element (Column 1, line 27, i.e. nucleation).

With respect to claim 32, Kubby discloses a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure (Column 3, lines 31-35; Column 5, lines 41-49, i.e. conventional CMOS processing).

With respect to claim 34, Kubby discloses a plurality of nozzle chambers each corresponding to a respective nozzle, and a plurality of said heater elements being disposed within each chamber, the heater elements within each chamber being formed on different respective layers (Fig. 1, elements 20 and 24) to one another (Column 1, lines 17-30).

With respect to claim 37, Kubby discloses each heater element is substantially covered by a conformal protective coating (Fig. 3, element Si_3N_4), the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless (Column 4, lines 38-43).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Silverbrook et al. (US 6,692,108 B1).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131

With respect to claim 1, Silverbrook discloses an ink jet printhead (Column 5, line 19) comprising:

- a plurality of nozzles (Fig. 30, element 3);
- a heater (Fig. 30, element 10) associated with each of the nozzles respectively, the heater having a heater element and a pair of electrodes (Fig. 30, element 15),
- the heater element configured for thermal contact with a bubble forming liquid (Column 5, lines 38-52) and
- the electrodes configured for connection to an electrical power source (Column 25, lines 3-4); such that, heating the heater element above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection a drop of ejectable liquid from the nozzle (Column 17, lines 20-44);

- wherein the heater is formed by layers of heater material (Column 17, lines 20-44), the number of layers forming the electrodes exceeds the number of layers forming the heater element (Fig. 30, elements 10 and 15).

With respect to claim 2, Silverbrook discloses the layers of heater material forming the element and the electrodes are spaced apart (Fig. 30, elements 10 and 15).

With respect to claim 3, Silverbrook discloses the element has two layers of heater material and the electrodes have three layers of heater material (Fig. 30, elements 10 and 15, i.e. electrical driving signal and ground).

With respect to claim 4, Silverbrook discloses the heater material is titanium nitride (Column 19, lines 56-65).

With respect to claim 5, Silverbrook discloses the bubble forming liquid and the ejectable liquid are of a common body of liquid (Claim 3).

With respect to claim 6, Silverbrook discloses a page and to be a page-width printhead (Claim 4).

With respect to claim 7, Silverbrook discloses each heater element is in the form of a cantilever beam (Column 11, line 4).

With respect to claim 8, Silverbrook discloses each heater element is configured such that an actuation energy of less than 500 nanojoules (nJ) is required to be applied to that heater element to heat that heater element sufficiently to form a said bubble in the bubble forming liquid thereby to cause the ejection of a said drop (Claim 1).

With respect to claim 9, Silverbrook discloses a supply of the ejectable liquid at an ambient temperature, wherein each heater element is configured such that the energy

required to be applied thereto to heat said part to cause the ejection of a said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of the said drop, from a temperature equal to said ambient temperature to said boiling point (Claim 7).

With respect to claim 10, Silverbrook discloses a substrate having a substrate surface, wherein the area density of the nozzles relative to the substrate surface exceeds 10,000 nozzles per square cm of substrate surface (Claim 8).

With respect to claim 11, Silverbrook discloses each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element (Claim 9).

With respect to claim 12, Silverbrook discloses the bubble, which each element is configured to form is collapsible and has a point of collapse, and wherein each heater element is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element (Claim 10).

With respect to claim 13, Silverbrook discloses a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure (Claim 11).

With respect to claim 14, Silverbrook discloses a structure, which is less than 10 microns thick, the nozzles being incorporated on the structure (Claim 12).

With respect to claim 15, Silverbrook discloses a plurality of nozzle chambers each corresponding to a respective nozzle, and a plurality of said heater elements being

disposed within each chamber, the heater elements within each chamber being formed on different respective layers to one another (Claim 13).

With respect to claim 16, Silverbrook discloses each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50 (Claim 14).

With respect to claim 17, Silverbrook discloses each heater element includes solid material and is configured for a mass of less than 10 nanograms of the solid material of that heater element to be heated to a temperature above said boiling point thereby to heat said part of the bubble forming liquid to a temperature above said boiling point to cause the ejection of a said drop (Claim 15).

With respect to claim 18, Silverbrook discloses each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless (Claim 16).

With respect to claim 19, Silverbrook discloses a printer system (Column 1, lines 6-10), which incorporates a printhead (Column 1, line 7), the printhead comprising:

- a plurality of nozzles (Fig. 30, element 3);
- a heater (Fig. 30, element 10) associated with each of the nozzles respectively, the heater having a heater element and a pair of electrodes (Fig. 30, element 15),
- the heater element configured for thermal contact with a bubble forming liquid (Column 5, lines 38-52) and

- the electrodes configured for connection to an electrical power source (Column 25, lines 3-4); such that, heating the heater element above the boiling point of the bubble forming liquid forms a gas bubble that causes the ejection a drop of ejectable liquid from the nozzle (Column 17, lines 20-44);
- wherein the heater is formed by layers of heater material (Column 17, lines 20-44), the number of layers forming the electrodes exceeds the number of layers forming the heater element (Fig. 30, elements 10 and 15).

With respect to claim 20, Silverbrook discloses the layers of heater material forming the element and the electrodes are spaced apart (Fig. 30, elements 10 and 15).

With respect to claim 21, Silverbrook discloses the element has two layers of heater material and the electrodes have three layers of heater material (Fig. 30, elements 10 and 15, i.e. electrical driving signal and ground).

With respect to claim 22, Silverbrook discloses the heater material is titanium nitride (Column 19, lines 56-65).

With respect to claim 23, Silverbrook the bubble forming liquid in thermal contact with each said heater element, and to support the ejectable liquid adjacent each nozzle (Claim 18).

With respect to claim 24, Silverbrook discloses the bubble forming liquid and the ejectable liquid are of a common body of liquid (Claim 19).

With respect to claim 25, Silverbrook discloses a page and to be a page-width printhead (Claim 20).

With respect to claim 26, Silverbrook discloses each heater element is in the form of a cantilever beam (Column 11, line 4).

With respect to claim 27, Silverbrook discloses each heater element is configured such that an actuation energy of less than 500 nanojoules (nJ) is required to be applied to that heater element to heat that heater element sufficiently to form a said bubble in the bubble forming liquid thereby to cause the ejection of a said drop (Claim 21).

With respect to claim 28, Silverbrook discloses a supply of the ejectable liquid at an ambient temperature, wherein each heater element is configured such that the energy required to be applied thereto to heat said part to cause the ejection of a said drop is less than the energy required to heat a volume of said ejectable liquid equal to the volume of the said drop, from a temperature equal to said ambient temperature to said boiling point (Claim 23).

With respect to claim 29, Silverbrook discloses a substrate having a substrate surface, wherein the area density of the nozzles relative to the substrate surface exceeds 10,000 nozzles per square cm of substrate surface (Claim 24).

With respect to claim 30, Silverbrook discloses each heater element has two opposite sides and is configured such that a said gas bubble formed by that heater element is formed at both of said sides of that heater element (Claim 25).

With respect to claim 31, Silverbrook discloses the bubble, which each element is configured to form is collapsible and has a point of collapse, and wherein each heater element is configured such that the point of collapse of a bubble formed thereby is spaced from that heater element (Claim 26).

With respect to claim 32, Silverbrook discloses a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure (Claim 27).

With respect to claim 33, Silverbrook discloses a structure, which is less than 10 microns thick, the nozzles being incorporated on the structure (Claim 28).

With respect to claim 34, Silverbrook discloses a plurality of nozzle chambers each corresponding to a respective nozzle, and a plurality of said heater elements being disposed within each chamber, the heater elements within each chamber being formed on different respective layers to one another (Claim 29).

With respect to claim 35, Silverbrook discloses each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50 (Claim 30).

With respect to claim 36, Silverbrook discloses each heater element includes solid material and is configured for a mass of less than 10 nanograms of the solid material of that heater element to be heated to a temperature above said boiling point thereby to heat said part of the bubble forming liquid to a temperature above said boiling point to cause the ejection of a said drop (Claim 31).

With respect to claim 37, Silverbrook discloses each heater element is substantially covered by a conformal protective coating, the coating of each heater element having been applied substantially to all sides of the heater element simultaneously such that the coating is seamless (Claim 32).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 4, 16, 17, 22, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US 5,706,041) in view of The Fabrication and Reliability Testing of Ti/TiN Heaters (DeMoor).

Kubby disclosed the claimed inventions with the exception of:

- the heater material is titanium nitride,
- each heater element is formed of solid material more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50, and
- each heater element includes solid material and is configured for a mass of less than 10 nanograms of the solid material of that heater element to be heated to a temperature above said boiling point thereby to heat said part of the bubble forming liquid to a temperature above said boiling point to cause the ejection of a said drop.

DeMoor discloses:

- it is desirable to use a heater made of Ti/TiN in integrated MEMS systems (a thermal inkjet is such a system), because this material provides the advantages

of CMOS fabrication (low cost and uniformity) in combination with a very high reliability (see conclusion),

- Ti has an atomic number of 22, and
- Each heater element includes solid material and is configured for a mass of less than 10 nanograms (Table 1 and Fabrication dimensions).

At the time the invention, it would have been obvious to one of ordinary skill in the art to use the Ti/TiN Heaters of DeMoor in the ink-jet printhead of Kubby. The motivation for doing so would have been to provide the advantages of CMOS fabrication (low cost and uniformity) in combination with a very high reliability Ti/TiN heater (Conclusion).

2. Claims 8 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US 5,706,041) in view of Silverbrook (US 5,841,452).

Kubby disclosed the claimed inventions with the exception of each heater element is configured such that an actuation energy of less than 500 nanojoules (nJ) is required to be applied to that heater element to heat that heater element sufficiently to form a said bubble in the bubble forming liquid thereby to cause the ejection of a said drop.

Silverbrook discloses a thermal ink jet printer, which uses heater energy of 200 nJ to eject ink. Using this energy allows the power dissipation to be reduced without affecting print speed (Column 18, lines 15-18).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the teachings of Silverbrook in the ink-jet printhead of Kubby. The

motivation for doing so would have been to reduce power dissipation without affecting print speed (Column 18, lines 15-18).

3. Claims 10 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US 5,706,041) in view of Feinn et al. (US 6,543,879 B1).

Kubby disclosed the claimed inventions with the exception of area density of the nozzles relative to the substrate surface exceeds 10,000 nozzles per square cm of substrate surface.

Feinn discloses an ink jet print head having a nozzle density of at least 10,000 nozzles per square cm (see Abstract) in order to improve the resolution of the print head (Column 1, lines 53-67).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the teachings of Feinn in the ink-jet printhead of Kubby. The motivation for doing so would have been to improve the drop generation rate of the print head (Column 1, lines 53-61).

4. Claims 14 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubby (US 5,706,041) in view of Kashino et al. (US 5,534,898).

Kubby disclosed the claimed inventions with the exception of a structure, which is less than 10 microns thick, the nozzles being incorporated on the structure.

Kashino discloses that it is desirable to have a nozzle plate that is only several microns thick, in order to obtain adequate values of drop velocity, drop size and refilling frequency (Column 6, lines 34-42).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the teachings of Kashino in the ink-jet printhead of Kubby. The motivation for doing so would have been to obtain adequate values of drop velocity, drop size and refilling frequency (Column 6, lines 34-42).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

STEPHEN MEIER
SUPERVISORY PATENT EXAMINER

GSM
3/24/2006

GM